STUDY OF THE WORKERS’ PERSPECTIVE CONCERNING THE IMPACT OF HEALTH AND SAFETY PROGRAMS TO THEIR PRODUCTIVITY – CASE STUDY: SMALL AND MEDIUM CONSTRUCTION FIRMS IN MAKASSAR

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ABSTRACT: The construction industry has risks to safety in its practice. However, workers and managers in construction industry generally do not respond well to the health and safety (HS) program. For example, the assumption that the use of safety equipment has negative impact on their productivity, so they tend to ignore the safety devices that should be provided. This study aims to identify the perceptions of construction workers against the elements of health and safety program that has dominant influence to worker’s productivity. The second aim is to explore the benefit of safety program interventions with respect to worker productivity. The finding shows that among eleven programs that has been identified, the use of personal protective equipment and engineering controls that are assessed have more positive impact on productivity. Overall, 73.47% of respondents considered that the HS program has no impact on worker productivity. Furthermore, 4.15% of respondents considered that the HS program actually has negative impact on their productivity.

Keywords: safety, construction, productivity

PROCEEDINGS AIMS AND SCOPES

INTRODUCTION

Safety and occupational health issues in sectors which prone to accidents such as the construction industry, has not been a part of Indonesian culture. This is reflected in data that the number of work accidents in 2009 in Indonesia is more than 54,000 cases. Among them, the totals of 20,086 cases are caused by violations of occupational health and safety (OHS) regulation (Solo Pos, 2010). On the other hand, research conducted by International Labor Organization pertaining to OHS standards reveals that Indonesia ranks 152 out of 153 countries which examined. This reflects that the safety practice in Indonesia is severe (PNRI, 2009).

A study by National Occupational Safety and Health Commission reveals that construction industry has the highest fatality rate in Australia. Between 2002 and 2003, 50 out of 10,000 workers were death (NOHSC 2005). This figure is two-fold higher than the average of all industrial accidents in Australia. Furthermore, Construction, Forestry, Mining and Energy Union (CFMEU) revealed that 50 workers died from construction workplace accidents in the past decade (CFMEU 2003). The figures above show that individuals who work in the construction industry dealing with hazardous and life-threatening working conditions.

In construction site, the problem of running a safe job is complicated by the fact that the nature of the work, the environment that it is conducted in, and the people involved constantly change. The safety requirements can be totally different from one construction task to another, and the requirements constantly change as the work moves from one stage to another. As the physical environment is transformed, new hazards and obstacles are created with various levels of risk. Construction workers generally consider the use of safety equipments are in contrast to their productivity, so they tend to ignore the safety equipments which should be provided. However, when accidents happen, the consequences have worse impact on their productivity. On the other hand, not only the victims of accidents that affect productivity, but the productivity of workers around the crash site were also affected due to the accident which distracts them from the tasks.

RESEARCH METHODOLOGY

A survey research method is applied in this study. The respondent is the construction workers who are considered able to assess of the risk of workplace accidents based on their experience. The characteristic of the sample is work experience more than 5 years in construction work. This characteristic is intended to

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provide information that can be regarded as an expert judgment. The numbers of participant are 52 respondents. Statistical test was conducted to examine whether the respondents have similar perceptions in providing an assessment.

CONSTRUCTION ACCIDENT FIGURES

The construction industry is highly competitive so that principal contractors are willing to award contracts to subcontractors with poor or untested safety practices. Once the subcontractors have started work on the site, unrealistic progress programs are then enforced on them. This situation creates a culture where the objective of many contractors is to get the job finished as quickly as possible and move on to the next project. Safe work practices are commonly being seen as time-consuming, believe that their work environment is dangerous, 57% of respondents suffered injuries due to accidents during 2002, and 41% of respondents working on the project site where a person suffered serious injuries in that year (Cole 2003).

Helander (in Sohail 1999) examined 739 deaths that occurred in the UK construction industry and found that 52% of deaths caused by fall from roofs, ladders and scaffolding, 19.4% caused by a falling object and caused heavy equipment at 18.5%. He also found that 5% of construction accidents occur during excavation work. Based on case studies in England, America, France, Canada and Sweden, he compared the construction industry accident with the accident in manufacture industries based on workers categories. The supervisor occupies a very high level of accidents due to falls from height and stepping on dangerous objects. The highest

![Construction Mechanisms of Injury](Larsson & Field, 2000)

PT. Jamsostek (in Tim Pengelola DPKK, 1999) describes workplace accident characteristic in Indonesian construction industry as follows: 30% caused by moving objects, 29% caused by falling objects, 26% caused by slipped and hit by object, 10% caused by fall from height, and 5% caused by electric shock, fire and explosion.

A study carried out by Australian Workers’ Union in 2002 to its 180 members reveals that 60% of respondents

level in plumber category is by falling object. As for the mason, the highest level is the result of the overexertion/strenuous movement.

Goldsmith (1987) in his study for the design and implementation of safety programs, establish the sources of accidents at construction sites which requires greater attention in safety programs. Those sources are:
1. Scaffolding and the stage,
2. Mechanical and electrical equipment which rotates/moves
3. Electric hand tools (especially saws, grinders, hammers, and drills),
4. Crane, chains, ropes, cables
5. Welding
6. Jackhammer
7. Wooden stairs
8. Hole
9. Waste material

Occupational Safety and Health Administration (OSHA) in the United States reported a study of 3,496 deaths on construction workers during 1985-1989. This study considers the variation of the number of deaths over 5 years, the influence of geographical factors and worker characteristics, such as industry groups, age, etc. This study also examines the causes of death and factors that cause accidents. Statistics from OSHA database are compared with the Bureau of Labor Statistics data, the National Institute for Occupational Safety and Health and the National Safety Council, which further classify the causes of accidents, namely: fall from height, struck down, physical contact, and electric shock. This study demonstrates the use of more detailed codification of the accident by using OSHA data. Overall, 33% of construction deaths are caused by falls, 22% by falling objects and 17% by a falling electric shock. OSHA report shows that 99% of falls is falling from a height at different levels, which mainly occurred on the roof and scaffolding; electric shocks are mostly related to connecting surface cable and only 7% of struck by object incidents involving moving materials. In addition, 67% of fall accidents involving the carpenters. In the report, OSHA groups the types of building construction works that the source of accidents as follows: plumbing, painting, electrical work, masonry work, plaster, timber works, roofing, concrete work, operation of heavy equipment, and demolition.

WorkCover (1999), an organization for occupational safety development established by the Department of Labor, New South Wales, Australia identified the hazards on building construction work by classifying the type of work as follows: metal roofing and electrical work, formwork mobile scaffolding, masonry, concrete works, and demolition.

In addition, Marosszeky (1998) in his presentation on site safety meter, classify the types of building construction works as a source of accidents as follows: roofing, demolition, concrete work, reinforcement, formwork, plumbing, electrical work, masonry, and scaffolding.

**FISHER TEST**

This statistic tool performs a simple analysis of variance on data for two or more samples. The analysis provides a test of the hypothesis that each sample is drawn from the same underlying probability distribution against the alternative hypothesis that underlying probability distributions are not the same for all samples.

\[
F = \frac{\left(\sum \left(\frac{\sum X_{Ai}}{n_{Ai}}\right)^2 - \frac{(\sum X_T)^2}{N}\right)}{\sum X_T^2 - \left(\sum \frac{(\sum X_{Ai})^2}{n_{Ai}}\right)} \div df_w
\]

(1)

**RESULT FINDINGS**

Among eleven programs that has been identified, the use of personal protective equipment and engineering controls that are assessed have more positive impact on productivity. Figure 2 shows the element of HS program that affect workers productivity.

costly, and something that slows down the work (Durham et al. 2002). It is widely accepted that the occupational health and safety performance of the construction industry is unacceptable (WorkCover NSW 2001, Cole 2003).

The construction industry is one of the major industries with significant injury risk and has an unacceptably high level of workplace fatalities, injuries and disease (McWilliams 2001). Study by Larsson and Field (2000) examined the risks within the industries in Victoria, Australia. The study found that construction workers have the higher incidence of injury among the other industries. Figure 1 shows the distribution of the Victorian construction mechanisms of injury. Falls from roof, ladders and scaffolding represent the most prominent accidents at work. Injuries sustained in contact with powertools, machinery, handtools, vehicle, and material are also very severe.
The use personal protective equipment makes workers feel protected against the hazards so that they can have the high mobility, but some personal protective equipment such as harnesses is deemed to obstruct or interfere with the mobility of workers.

Control engineering is an attempt to design or use certain tools in order to minimize the hazard. The workers feel more secure and high mobility when working at height using steel as compared to bamboo scaffolding.

Ergonomic environment and good housekeeping also have a positive impact, but to get the ideal conditions for the both elements, it is necessary to provide labor time; therefore, these elements are not considered have significant impact in increasing the duration of the work.

Procedures and HS regulations, and isolation of hazards such as the use of barriers to cut off the hazard are not considered have a significant positive effect due to meet the requirements and make the isolation requires long duration.

In general, HS training, HS supervision and HS communication, casualties management and administrative controls are not correlated with labor productivity in the short term, but the positive impact of these elements will be gained in the long term.

Overall, 73.47% of respondents considered that the HS program has no impact on worker productivity. Furthermore, 4.15% of respondents considered that the HS program actually has negative impact on their productivity (Figure 3). Based on the perception of respondents about the notion of productivity as described above, it can be explained that the workers need a longer working duration if they need to meet safety standards.

Statistical analysis using Fisher test with α=10% shows that F < Fcrit and all P-value of this analysis is
less than 0.1 which indicate that respondents had similar perceptions in assessing the parameters in the questioner.

CONCLUSION

Occupational health and safety program is intended to minimize the risks and potential hazards. This program is not intended to directly increase labor productivity. Thus, health and safety program has no correlation to the productivity of labor. In certain circumstances, health and safety program actually contra to labor’s productivity.

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